

What is Claimed is:

1. A method of preparing an organometal compound comprising the step of reacting a triorgano boron compound with a metal halide compound, wherein the metal halide compound comprises a metal selected from gallium, indium, aluminum, cadmium and zinc.
2. The method of claim 1 wherein the organometal compound is free of oxygenated impurities.
3. The method of claim 1 wherein the metal halide compound has the formula MY_a wherein each Y is independently halogen, alkyl or aryl; a is the valence of the metal; and M is gallium, indium, aluminum, cadmium or zinc; and at least one Y is halogen.
4. The method of claim 3 wherein the metal halide compound is a metal trihalide metal compound.
5. The method of claim 1 wherein the triorgano boron compound has the formula Z_3B , wherein each Z is independently selected from halogen, (C_1-C_6) alkyl, (C_2-C_6) alkenyl or aryl, provided that at least one Z is alkyl, alkenyl or aryl.
6. The method of claim 1 further wherein the triorgano boron compound and the metal halide compound are reacted in an organic solvent.
7. The method of claim 6 wherein the organic solvent is free of oxygen substitution.
8. The method of claim 1 wherein the metal is gallium, indium, or zinc.
9. A method for preparing an organometal compound comprising the steps of: reacting a triorgano boron compound with a metal halide compound, wherein the metal halide comprises a metal selected from gallium, indium, aluminum, cadmium and zinc, to form a boron trihalide compound and the organometal compound; isolating the boron trihalide compound; and reacting the boron trihalide compound with an organo aluminum compound or an alcohol.
10. A method of preparing a trialkyl gallium compound comprising the step of reacting a trialkyl boron compound with a gallium trihalide compound.
11. The method of claim 10 wherein the gallium trihalide compound is selected from gallium trichloride, gallium tribromide and gallium triiodide.

12. The method of claim 10 wherein the trialkyl boron compound is selected from trimethyl boron, triethyl boron, tripropyl boron and tributyl boron.
13. A trialkyl gallium or trialkyl indium compound free of ethereal solvent, oxygenated impurities, silicon, aluminum and zinc.
14. The compound of claim 13 wherein the trialkyl gallium compound is selected from trimethyl gallium, triethyl gallium, tripropyl gallium and tributyl gallium.
15. The compound of claim 13 wherein the trialkyl indium compound is selected from trimethyl indium, trimethyl indium, tripropyl indium and tributyl indium.
16. A method of depositing a metal layer comprising the steps of: a) conveying a trialkyl gallium or trialkyl indium compound of claim 13 in the gaseous phase to a deposition chamber containing the substrate; b) decomposing the trialkyl gallium or trialkyl indium compound in the deposition chamber; and c) depositing a layer comprising gallium or indium on the substrate.
17. The method of claim 16 wherein the trialkyl gallium compound is selected from trimethyl gallium, triethyl gallium, tripropyl gallium and tributyl gallium.
18. The method of claim 16 wherein the trialkyl indium compound is selected from trimethyl indium, trimethyl indium, tripropyl indium and tributyl indium.